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REPORT OF THE COUNCIL.

SINCE the Annual Meeting of the 10th of May, 1893, the Academy has lost by death eleven members ; — five Fellows, Moses Gerry Farmer, Hermann August Hagen, Henry Warren Paine, Francis Parkman, and Henry Warren Torrey ; and six Foreign Honorary Members, Pierre Joseph Van Beneden, Charles Edward Brown-Séquard, Benjamin Jowett, Jean Charles Galinard de Marignac, Charles Merivale, and Sir James Fitz James Stephen.

RESIDENT FELLOWS.

MOSES GERRISH FARMER.

MOSES GERRISH FARMER was born in Boscawen, New Hampshire, in 1820. In his youth he had strong predilections towards scientific matters, and displayed some ability as a mathematician and as a musician, being able to play with skill upon the organ and some other instruments. In 1837 he was sent to Phillips Academy, where it seems he did as so many others having marked ability are reported to have done at school, namely, chosen to do something else than what was required of them, and here he was admonished that he was “disappointing the best hopes of his friends.” He contrived, however, to enter Dartmouth College in 1840, but left before completing the college course. He began teaching at Elliot, Maine, and soon after had charge of the Belknap School in Dover, New Hampshire, where he remained until 1847. He became interested in electrical phenomena in 1845, and from that time on he devoted himself to enlarging the sphere of electrical industries, and in perfecting the apparatus employed. It is to be remembered that the first telegraphic line was built and operated in 1844, and on its success being demonstrated its development was very rapid, and Farmer became an operator and inspector in 1847, moving to South

Framingham, Massachusetts. He had already invented an electro-magnetic engine and an electric locomotive, and had given numerous lectures on electrical subjects in the towns and cities about. It was at this time he devised the fire alarm system which was soon adopted by the city of Boston, he superintending its construction. This work has been ranked as the beginning of electrical engineering in the world. The automatic signalling apparatus, the control of powerful mechanical apparatus at a distance, the closed electrical circuits to be worked by interruptions, the adjustment of such circuits to a properly constructed battery, the devising of magneto-electric machines for producing powerful currents and driving such machines by water power, the protection of the conductors by placing them in pipes, the protection of the station itself from lightning by special ingenious apparatus, with many more things essential for the proper working and efficiency of the system, were devised by him, — for there were no such devices in existence and there was no experience. He was at work in an altogether new field, and his work was so well done that his system was adopted presently by all the cities in the country.

Mr. Farmer's work at Framingham required much Sabbath attention, and as he had conscientious scruples against such work he abandoned the position and moved to Salem in 1848. Here he devised several improvements in telegraphic apparatus, and became superintendent of the telegraphic line from Boston to Burlington, Vermont. Some of his inventions made within the next ten years have since been indispensable in doing telegraphic work. What is known as the automatic repeater is one with which he had succeeded before 1855 in sending four messages simultaneously over one wire, — what has since been called the quadruplex system. He invented too the first automatic printing telegraph, now known as the *ticker*.

In 1855 he succeeded in electrically depositing aluminum, and constructed for the Dudley Astronomical Observatory at Albany a chronograph and an electrical clock.

In 1856 he made an electric gyroscope so as to run continuously at uniform speed, and he read in that year a paper on Multiplex Telegraphy before the American Association for the Advancement of Science.

About this time he began investigations in the problem of electric lighting and advanced so far as to have his parlor in Salem lighted by an incandescent electric lamp in 1859. The supply of electricity was furnished by a galvanic battery, and he satisfied himself that with such a source of electricity electric lighting was not feasible.

From 1864 to 1868 he experimented much with thermo-electric devices, and discovered an alloy to be used for such a battery that had much higher efficiency than any others which had been employed, — one that compared favorably with the best we now have, except that it is rather too brittle for commercial use. With such a source, however, he coated steel and iron wire with copper for the sake of combining high conductivity with great tensile strength, and this was developed into a commercial enterprise of considerable magnitude. It was abandoned for some years, but its superior qualities for telephonic work have again made demand for it.

It appears that the first written description of what is now known as the self-exciting dynamo, in which the dynamo current is sent through its own field coils to strengthen its magnetism, was by Mr. Farmer in a letter to an eminent English electrician. The same idea occurred to several others about the same time, notably Siemens and Varley, but its immense importance did not so impress any of them as to put the idea into a practical form, and it remained for others unknown before in the electrical field to put it into the commercial shape so familiar now.

In 1872 he was appointed Professor of Electrical Science at the Torpedo Station at Newport, Rhode Island, a position which was quite to his taste, and where he remained for nine years.

During the first fifty years of his life he was in a constant struggle with poverty and sickness. Like Agassiz, he had no time to make money. He was so fertile in new things, he cared but little for the worth of his inventions; though he took out many patents, he profited little from them. His work was mostly of a fundamental sort, and few persons who have applied for patents on electrical devices for the past twenty years have not found that Farmer had preceded them in their territory, and there were few who had new ideas on any electrical matter who could not find in some of his numerous note-books the identical things already specified, and oftentimes the experimental work done, but not published, for he does not appear to have written much.

Mr. Farmer's relation to the electric lighting industry has not been generally known, but it appears that in 1868 he had a dynamo made with which he lighted forty incandescent electric lamps, in multiple arrangement, as is now the practice, and automatically regulated. His lamps were of iridium, which he found to possess the proper electrical qualities, but that metal not being found in an available form for commercial use, the system now so common was by him devised

and carried out, lacking only the vacuum carbon lamp for completion. A fire in 1868 destroyed this first dynamo. The armature was the only portion that was rescued, and this was exhibited at the World's Fair in Chicago as part of an historic exhibit which he was preparing of his own work, when he was suddenly prostrated and died. For a number of years he had been unable to walk, owing to a paralytic attack, and it became impossible for him to do any work. Love for electrical science remained with him to the last, and it was a real pleasure to hear him tell of his attempts, his successes and his failures, though he was not one to introduce personal matters in conversation.

There is one event in his life which is worth chronicling, and which may not find its way into other notices. It may be remembered that a certain Dr. Gary, in 1878, had for a while on exhibition in Boston a machine which purported to be a perpetual motion. It was made with permanent magnets, and had a rotating armature so mounted as to change its polarity at certain points. Many saw this machine, but most thought there was some fraud about it. Professor Farmer went to see it, and asked permission to examine it, and was told he might take it to pieces and reconstruct it himself if he liked, which he did, and he told the writer the machine actually started up and ran without further attention. He offered to buy it, but the inventor did not want to sell. As Professor Farmer was an expert mechanic and electrician, it would seem unlikely that a piece of trickery should not have been discovered when subjected to such a critical examination in his own hands. To me it seems more likely that in some way there was a draught of energy for the propulsion from some source not hitherto recognized, able for a while to supply a small amount, for the machine would not run long at a time; but that it should run at all is the wonder, and Professor Farmer testifies that it did.

During the last years of his life he lived in Elliot, Maine, able to do but little on account of his paralysis. He could ride about somewhat and was an occasional visitor to Boston, but the younger race of electricians know of him only as a name. His work was chiefly done when electrical nomenclature had no existence, when there were no standards, when the whole field was new and telegraphy was growing, as the electric lighting industry has grown during the past ten years, and there was a great demand for electrical facilities for that kind of work. Mechanical aptitude was as much needed as an ally as it is now, and this combination of talents Professor Farmer possessed in a high degree.

1894.

A. E. DOLBEAR.